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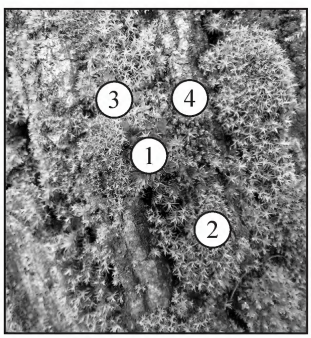

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A CHECKLIST OF BRYOPHTYES OF THE PALOS VERDES PENINSULA, CALIFORNIA

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ABSTRACT: A checklist of bryophytes is presented from collections made on the Palos Verdes Peninsula between 2016 and 2017. A total of 75 species of bryophytes were found, representing 43 genera in 23 families. This checklist provides baseline data for future studies of the bryophyte flora of the Palos Verdes Peninsula.

KEYWORDS: Biodiversity, bryophytes, Palos Verdes Peninsula, flora, mosses, liverworts.

INTRODUCTION

The bryophyte flora of the Palos Verdes Peninsula (hereafter, PVP), California, USA, is poorly known in contrast to its vascular plant flora. According to the Consortium of Bryophyte Herbaria database (CNABH 2022), prior to this survey only 15 bryophyte specimens had been vouchered from the PVP with 10 of those 15 vouchers being from the 1930's, and many being duplicates of the same species. Thus, a survey of the bryophytes of the PVP was conducted between 2016 and 2017 as a part of a Master of Science thesis project at California State University Dominguez Hills (Uelman 2016), in order to increase our knowledge of the bryophyte diversity of this region.

The cool, moist maritime climate and diverse topography of the PVP provide excellent conditions for bryophytes. The PVP is known for its scenic coastline, island history, and remnant patches of native plant communities such as coastal sage scrub (hereafter CSS), willow riparian, back dune, coastal bluff scrub, grassland, and chaparral. These remnant patches dot the landscape and represent some of the last remaining stands of these plant communities between Orange County and the Santa Monica Mountains. Also found in these remnant patches is biological soil crust (hereafter, BSC) which occupies the soil surface between vegetation. Biological soil crust is a micro-community of highly specialized organisms that interact with each other and the soil particles to transform the upper portions of the soil matrix into a living cover (Belnap et al. 2001a; Belnap et al. 2001b). Biological soil crust in semi-arid and arid lands is often home to numerous species of bryophytes (Rosentreter et al. 2007). The unique biogeographical relationships of the PVP to the Channel Islands, the islands of Baja California and coastal southern California, presents numerous interesting questions and conservation concerns regarding its vascular and non-vascular flora.

Few studies have been conducted on the bryophyte diversity of southern California (early studies are summarized by Harthill et al. 1979), especially the coastal flora of mainland southern California and Baja California. The Channel Islands were surveyed for bryophytes by Carter (2015), and the Santa Monica Mountains, northwest of the PVP, have also been surveyed for bryophyte diversity (Sagar & Wilson 2007, Sagar & Wilson 2009). This checklist fills a gap in knowledge regarding bryophyte biodiversity and distribution on the PVP and in southern California as a whole.

Physical Setting

The PVP is situated on the southwestern edge of Los Angeles County and extends into the Pacific Ocean from the mainland (Figure 1). It is characterized by steep coastal bluffs up to 60 m tall, terraced hillsides, and numerous drainages including Miraleste Canyon, Que Viento Canyon, Altamira Canyon, Agua Amarga Canyon, Malaga Canyon, and George F Canyon to name a few. The George F Canyon, Altamira Canyon, Agua Amarga Canyon, and the Malaga Canyon were explored while performing surveys. The PVP is 15 km long and 8 km wide and includes both the Palos Verdes Hills and the San Pedro Hill. These hills have a mixture of suburban communities and open space. Access to most of the open spaces is via over 16,000 acres in nature preserves managed by the Palos Verdes Peninsula Land Conservancy (PVPLC). These preserves include the Palos Verdes Preserve in Rancho Palos Verdes and the George F Canyon Preserve and Linden H, Chandler Preserve in the city of Rolling Hills Estates. Many of the survey trips were conducted throughout the Palos Verdes Preserve and the George F Canyon Preserve. Elevation of the PVP ranges from sea level to 451 meters at the top of San Pedro Hill. The PVP has a Mediterranean climate and typically receives its rainfall from late fall through late spring (November to May). The average rainfall on the PVP is up to 16 inches (Gale 1988). The temperature on the PVP typically varies from 51˚F to 76˚F and is rarely below 46˚F or above 84˚F (Gale 1988). Frost events on the PVP rarely occur and if present are very light. The PVP has a strong maritime influence and dense sea fog is very common throughout the year. The dense sea fog is especially prevalent during the late spring to early summer months (May through July) and these months often see cloudiness persisting for weeks.

The PVP has an intriguing geological history, that is relevant to the biogeography of its extant flora and fauna. Tectonic movements, which eventually gave rise to the peninsula, started in the Pliocene (5.3 mya to 2.6 mya) and resulted in the submarine formation of a doubly-plunging anticline along the south side of the northwest-trending Palos Verdes fault (Woodring et al. 1946, Dibble 2000). This anticline emerged first as an island during the early Pleistocene (ca. 2.8 mya), only becoming part of the mainland Los Angeles Basin by the end of the Pleistocene around 11,700 ya (Woodring et al. 1946, Dibble 2000). The oldest

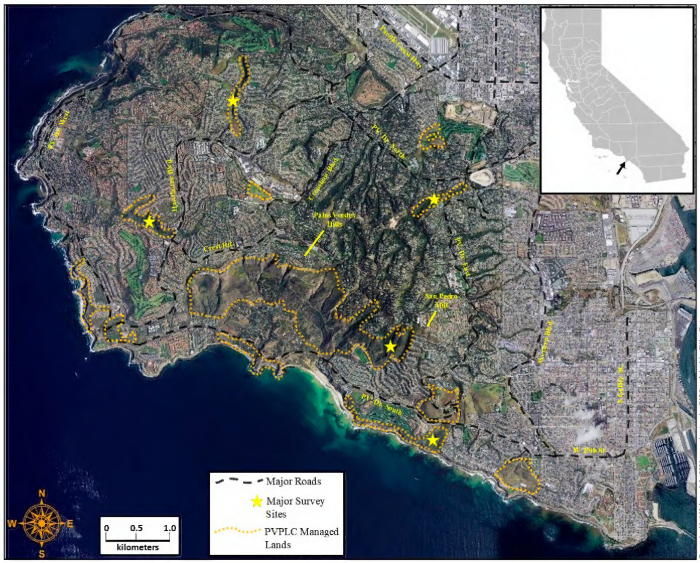

Figure 1. Location of the Palos Verdes Peninsula, California, and relationship to surrounding features.

rocks found on the PVP are from the Jurassic Period (150 mya). These rocks are known as Catalina Schist and form the lowest layer of the PVP. Lying on top of the Catalina Schist is a diverse mixture of sands, silts, gravels, and clay collectively known as the Monterey Shale, which provides numerous substrate types for the vegetation communities of the PVP (Figure 2).

Coastal sage scrub, which is one of the major plant communities found on the PVP, primarily consists of *Artemisia californica* Less., *Salvia leucophylla* Greene, *Encelia californica* Nutt., *Eriogonum cinereum* Benth., *Eriogonum fasciculatum* Benth., *Opuntia oricola* Philbrick, *Opuntia littoralis* (Engelm.) Cockerell, *Malosma laurina* (Nutt.) Nutt. ex Abrams, *Stipa lepida* Hitchc., *Melica imperfecta* Trin., *Elymus condensatus* J. Presl, and *Rhus integrifolia* (Nutt.) Benth. & Hook. f. ex Rothr. An interesting component of CSS on the PVP is that it is heavily dominated by *Rhus integrifolia*. Another major plant community found on the PVP is riparian woodland. The PVP's riparian woodland primarily consists of *Salix lasiolepis* Benth., *Salix laevigata* Bebb, *Artemisia douglasiana* Besser, *Baccharis salicifolia* (Ruiz & Pav.) Pers. subsp. *salicifolia*, *Urtica dioica* L. subsp. *holosericea* (Nutt.) Thorne, *Toxicodendron diversilobum* (Torr. & A. Gray) Greene, *Rhus integrifolia*, *Rubus ursinus* Cham. & Schltdl., and *Sambucus mexicana* C. Presl ex DC. The last major plant community on the PVP is coastal bluff scrub. The PVP's coastal bluff scrub primarily consists of *Atriplex lentiformis* (Torr.) S. Watson, *Encelia californica*, *Opuntia littoralis*, *Opuntia oricola*, *Cylindropuntia prolifera* (Engelm.) F.M. Knuth, *Suaeda taxifolia* (Standl.) Standl., *Lycium californicum* Nutt., *Isocoma menziesii* (Hook. & Arn.) G.L. Nesom var. *sedoides* (Greene) G.L. Nesom, *Extriplex californica* (Moq.) E.H. Zacharias, *Eriogonum parvifolium* Sm., *Rhus integrifolia*, and *Cleomella arborea* (Nutt. ex Torr. & A. Gray) Roalson & J.C. Hall var. *arborea*.

METHODS

Collecting trips were made between winter of 2016 and spring of 2017. A total of 15 days were spent collecting within the Palos Verdes Preserve, George F Canyon Preserve, and the Linden H. Chandler Preserve. The majority of the surveys were conducted in late winter (February 2017) and early spring (April 2017) in the Forrestal Nature Reserve, which is part of the greater Palos Verdes Preserve system, the George F Canyon Preserve, the Malaga Reserve, Agua Amarga Reserve, and Ocean Trails Reserve after adequate rains had come to the area (411 mm [16.17 inches] of rainfall). Both the Palos Verdes Preserve and the George F Canyon Preserve have some of the best remaining patches of intact native habitat, such as coastal sage scrub and riparian woodland, so were of top priority for the surveys. A few additional collections were made and added to the checklist in 2021, 2022, and 2023. The survey sites were searched for both terrestrial and epiphytic bryophyte species. Collections were made from tree bark, fallen branches, bare soil, and rock. Mosses were identified using the Flora of North America, volumes 27 and 28 (Flora of North America Editorial Committee 2007, 2014). Liverworts and hornworts were identified using Doyle and Stotler (2006) and nomenclature for liverworts and hornworts follows Stotler and Crandall-Stotler (2017). All collections were georeferenced

using a Garmin GPS 72H with +/- 3 m accuracy, and vouchers were deposited in the herbarium of California State University, Northridge (Consortum of Bryophyte Herbaria: SFV-B).

RESULTS

Approximately 271 bryophyte vouchers were collected during the study. From these, a total of 75 species were identified, comprising 43 genera in 23 families. One special status species, *Tortula californica* E.B. Bartram (CNPS 1B.2), was found growing on soil within BSC in the Forrestal Nature Reserve. The species identified, their subjective abundance (rare, uncommon, common, abundant), and the substrate on which they were found are included in the checklist.

DISCUSSION

The Mediterranean climate of the PVP, its proximity to the ocean, and its complex topography allow a diverse suite of native plant species to inhabit the area. The limited bryophyte collection history on the PVP has resulted in a limited knowledge of the bryophyte flora. Although small in comparison with the native vascular flora of the PVP, the bryophyte flora still contributes to the overall biodiversity of the area (Figure 3 and 4). The PVP bryophyte flora shares similar species with the Santa Monica Mountains (Sagar & Wilson 2007) and the Channel Islands, especially with Catalina, San Clemente, and Santa Cruz Islands (Carter 2015).

The bryophyte families most commonly encountered on the PVP were the Pottiaceae, Bryaceae, and Brachytheciaceae, all of which are mosses. Liverworts were encountered less frequently than mosses and were restricted to mesic areas and more protected sites. Hornworts were extremely uncommon and were found only along the George F Canyon.

Biological soil crust was found throughout the PVP on soil between and under shrubs. Mosses were a major component of both early and late successional BSC, along with lichens, algae, and cyanobacteria (Figure 5). The thirteen mosses found within BSC were all acrocarpous mosses, and six of these appear to be

Figure 2. Examples of plant communities on the Palos Verdes Peninsula: **A)** Coastal sage scrub; **B)** Willow riparian; **C)** Coastal bluff scrub. Photos by author.

Figure 3. Examples of bryophyte species on the Palos Verdes Peninsula: **A)** *Paraphymatoceros pearsonii* growing on soil; **B)** *Scleropodium touretii* growing on thin soil over rock; **C)** *Asterella californica* on soil; D) *Fossombronia longiseta* on soil; **E)** *Riccia sorocarpa* on soil; **F)** *Aloina aloides var. ambigua* on soil within biological soil crust (10X magnification, red arrow); **G)** *Vinealobryum vinealis* growing on rock. Photos by author.

restricted to BSC. No liverworts or hornworts were found in BSC on the PVP.

Bryophyte species of interest collected include the liverwort *Sphaerocarpos michelii* Bellardi (Sphaerocarpaceae) and the mosses *Gemmabryum kunzei* (Hornsch.) J.R. Spence (Bryaceae), and *Tortula californica* (Pottiaceae).

Tortula californica (*Uelman 75*) was collected from late successional BSC in the shade of a *Heteromeles arbutifolia* (Lindl.) M. Roem. in remnant intact CSS in the Forrestal Nature Reserve (Figure 4C). This moss has a California Rare Plant Rank of 1B.2, and this collection adds to the overall understanding of the distribution and rarity of this moss in California.

Gemmabryum kunzei (*Uelman 91*) was collected from rock crevices on a large outcrop of Catalina Schist (Figure 4B) on a mesic slope in the George F Canyon Preserve. *Gemmabryum kunzei* collected from the PVP has a very compact, cushionlike form, which is unusual for this species and may represent a distinct taxon (Spence 2014).

The liverwort *Sphaerocarpos michelii* (*Uelman 142*) was collected on soil from a mesic slope along the George F Canyon (Figure 4A). This collection represents a southern range extension of approximately 490 km (304.71 mi) for this species in California, as it has previously only been vouchered from San Mateo and Santa Cruz (CNABH 2022).

There is much work left to do, and this checklist provides only a snapshot of the current bryophyte flora of the PVP to date. But there is little doubt that further exploration of the PVP will yield many new discoveries in the bryophyte flora.

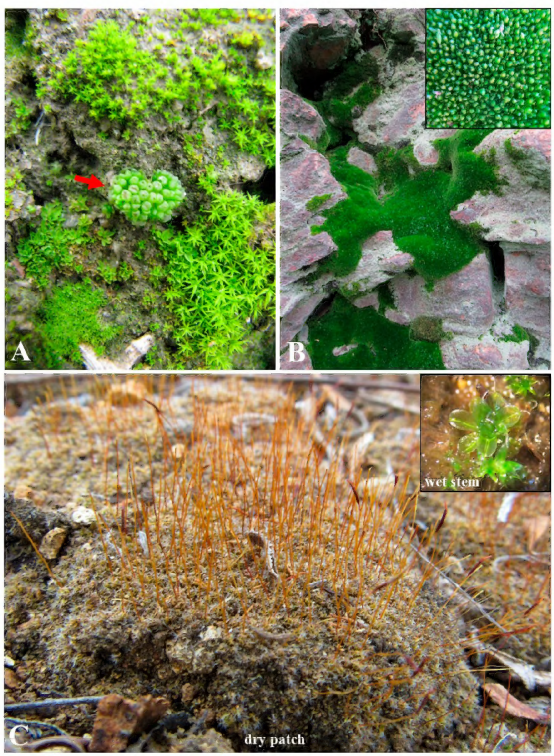

Figure 4. Bryophytes of interest collected: **A)** *Sphaerocarpos michelii* (red arrow) growing on soil; **B)** *Gemmabryum kunzei*, compact, cushionlike form growing in crevices of Catalina Schist with closeup; **C)** Dry patch of *Tortula californica* (CRPR 1B.2) growing on soil within biological soil crust with closeup of hydrated stem. Photos by author.

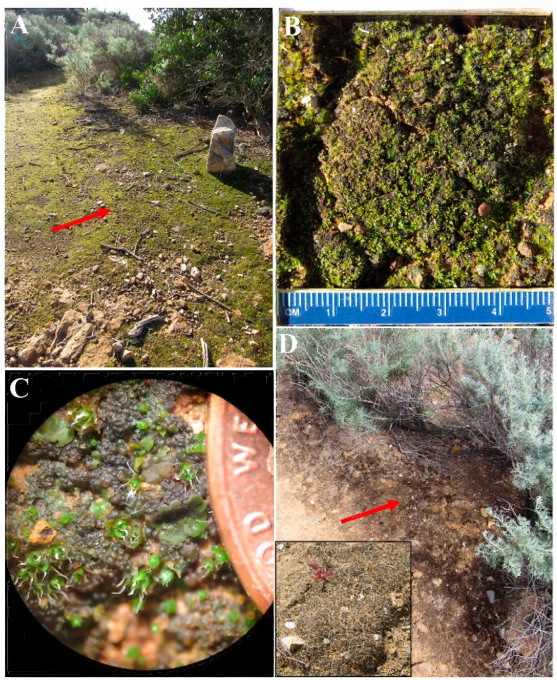

Figure 5. Mosses in late successional biological soil crust on the Palos Verdes Peninsula: **A)** Late successional biological soil crust in spaces between shrubs (red arrow) note green color of soil from high density of mosses; **B)** Closeup (5 cm) of soil from photo A, showing mosses, lichens, and cyanobacteria; **C)** Closeup of soil from photo A under 20X magnification showing high density of mosses, lichens, and cyanobacteria (penny for scale); **D)** Dried late successional biological soil crust (red arrow) with closeup. Photos by author.

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Checklist of the bryophytes of the Palos Verdes Peninsula

The following is a list of the bryophyte taxa documented from the PVP mainly from floristic surveys done between winter of 2016 and spring 2017, with additional collections in 2021, 2022, and 2023. Family classification for mosses follows the Flora of North America, volumes 27 and 28 (Flora of North America Editorial Committee 2007, 2014). Nomenclature and classification of genera and species for mosses conforms to the Flora of North America, volumes 27 and 28 (Flora of North America Editorial Committee 2007, 2014). Nomenclature and classification of families, genera, and species for liverworts and hornworts follows Stotler and Crandall-Stotler (2017). All voucher specimens cited in this checklist are housed at the herbarium at California State University, Northridge (Consortium of Bryophyte Herbaria: SFV-B).

New records for the Palos Verdes Peninsula are denoted with a dagger (†)
Previously vouchered species are denoted with a plus (+)
Previously vouchered species not found during these surveys are denoted with an asterisk (*)
Species found in biological soil crust are denoted with a caret (^)

BRYOPHYTA

Amblystegiaceae

†***Amblystegium serpens*** (Hedw.) Schimp. Uncommon. Found on soil. *Uelman 188* (SFV-B)

†***Conardia compacta*** (Hook.) H. Rob. Rare. Found on bark at the base of *Salix lasiolepis* in mesic areas. *Uelman 259* (SFV-B)

†***Leptodictyum riparium*** (Hedw.) Warnst. Uncommon. Found on rock in streams. *Uelman 50* (SFV-B)

Brachytheciaceae

†***Brachytheciastrum velutinum* var. *velutinum*** (Hedw.) Ignatov & Huttunen. Rare. Found on unidentified decaying wood. *Uelman 191* (SFV-B)

+***Homalothecium arenarium*** (Lesq.) E. Lawton. Common. Found on soil over rock. *Wilson 5502* (SFV-B), *Uelman 26* (SFV-B)

†***Homalothecium nuttallii*** (Wilson) A. Jaeger. Uncommon. Found on branches of *Salix lasiolepis* and *Salix laevigata* in mesic areas. *Uelman 252* (SFV-B)

†***Scleropodium californicum*** (Lesq.) Kindb. Abundant. Found on soil over rock. *Uelman 187* (SFV-B)

†***Scleropodium cespitans*** (Mull. Hal.) L.F. Koch. Uncommon. Found on bark at the base of *Salix lasiolepis* in mesic areas. *Uelman 255* (SFV-B)

†***Scleropodium obtusifolium*** (Mitt.) Kindb. Rare. Found on soil in seasonal streams. *Uelman 106* (SFV-B)

†***Scleropodium occidentale*** B.E. Carter. Uncommon. Found on soil on the banks of seasonal streams. *Uelman 256* (SFV-B)

+***Scleropodium touretti*** (Brid.) L.F. Koch. Abundant. Found on soil. *Wilson 5491* (SFV-B), *Uelman 23* (SFV-B)

Bryaceae

†^***Bryum argenteum*** Hedw. Common. Found on soil, crevices in brick, and in biological soil crust. *Uelman 136* SFV-B)

†***Gemmabryum caespiticium*** (Hedw.) J.R. Spence. Uncommon. Found on disturbed soil. *Uelman 99* SFV-B)

†***Gemmabryum gemmiferum*** (R. Wilczek & Demaret) J.R. Spence. Uncommon. Found on disturbed soil. *Uelman* 94 SFV-B)

†***Gemmabryum kunzei*** (Hornsch.) J.R. Spence. Rare. Found in rock crevices of George F Canyon. This form is compact and cushion-like form. *Uelman 91* SFV-B)

†^***Gemmabryum radiculosum*** (Brid.) J.R. Spence & H.P. Ramsay. Abundant. Found on soil, thin soil over rock, and in biological soil crust. *Uelman 138* SFV-B)

†***Gemmabryum ruderale*** (Crundw. & Nyholm) J.R. Spence. Uncommon. Found on disturbed soil. *Uelman 102* SFV-B)

+***Gemmabryum valparaisense*** (Ther.) J.R. Spence. Uncommon. Found on soil. *Wilson 5495* (SFV-B, *Uelman 100* SFV-B)

†***Gemmabryum vinosum*** J.R. Spence & K. Kellman. Uncommon. Found on soil. *Uelman 87* (SFV-B)

†***Gemmabryum violaceum*** (Crundw. & Nyholm) J.R. Spence. Uncommon. Found on soil. *Uelman 101* (SFV-B)

†***Rosulabryum laevifilum*** (Syed) Ochyra. Rare. Found on rotting branches of *Heteromeles arbutifolia*. *Uelman* 269 (SFV-B)

†***Rosulabryum sanguilentum*** (Renauld & Cardot) J.R. Spence & Brenda. Abundant. Found on soil and unidentified rotting wood. *Uelman 127* (SFV-B)

Dicranaceae

†***Dicranella varia*** (Hedw.) Schimp. Rare. Found on soil along trails. *Uelman* 56 (SFV-B)

Ditrichaceae

†***Pleuridium subulatum*** (Hedw.) Rabenh. Rare. Found on sandy soil. *Uelman 83* (SFV-B)

Fissidentaceae

†***Fissidens crispus*** Mont. Uncommon. Found on soil. *Uelman 180* (SFV-B)
†***Fissidens curvatus*** Hornsch. Common. Found on soil. *Uelman 71* (SFV-B)
†***Fissidens sublimbatus*** Grout. Abundant. Found on soil in shade. *Uelman* 76 (SFV-B)

Funariaceae

+***Funaria hygrometrica*** Hedw. Abundant. Found on soil. *Detmers s. n.* (MICH), *Uelman 41* (SFV-B)
****Funaria microstoma*** Schim. *Detmers s. n.* (MICH)
†***Funaria muhlenbergii*** Turner. Rare. Found on soil. *Uelman 42* (SFV-B)

Grimmiaceae

†***Grimmia lisae*** De Not. Rare. Found on exposed rocks. *Uelman 54* (SFV-B)

Hedwigiaceae

†***Pseudobraunia californica*** (Lesq.) Broth. Rare. Found on exposed rock. *Uelman 114* (SFV-B)

Leskeaceae

†***Claopodium whippleanum*** (Sull.) Renauld & Cardot. Rare. Found on soil. *Uelman 46* (SFV-B)

Leucodontaceae

†***Nogopterium gracile*** (Hedw.) Crosby & W.R. Buck. Rare. Found on bark of *Sambucus mexicana*, at the base of the main trunk, in mesic canyons. *Uelman 47* (SFV-B)

Mniaceae

†***Pohlia atropurpurea*** (Hedw.) Lindb. Uncommon. Found on disturbed sandy soil. *Uelman 55* (SFV-B)

Orthotrichaceae

†***Orthotrichum franciscanum*** F. Lara, R. Medina & Garilleti. Uncommon. Found on branches of *Sambucus mexicana* in mesic areas. *Uelman 256* (SFV-B)

Pottiaceae

†^***Aloina aloides var. ambigua*** (Bruch & Schimp) E.J. Craig. Uncommon. Found in biological soil crust. *Uelman 261* (SFV-B)
†^***Aloina bifrons*** (De Not.) Delgad. Uncommon. Found in biological soil crust. *Uelman 169* (SFV-B)
†^ ***Crossidium seriatum*** Crum & Steere. Uncommon. Found in biological soil crust. *Uelman 177* (SFV-B)
†^***Crossidium squamiferum*** (Viv.) Jur. Uncommon. Found in biological soil crust. *Uelman 160* (SFV-B)
†***Crumia latifolia*** (Kindb.) W.B. Schofield. Rare. Found on exposed rock (shale) in a perennial spring. *Uelman 251* SFV-B)
†***Didymodon rigidulus*** Hedw. Uncommon. Found on exposed rock in mesic areas. *Uelman 266* (SFV-B)
†***Geheebia fallax*** (Hedw.) R.H. Zander. Uncommon. Found on soil in mesic areas. *Uelman 196* (SFV-B)
†***Geheebia tophacea*** (Brid.) R.H. Zander. Common. Found on rock and soil in streams. *Uelman 228* (SFV-B).
†***Gymnostomum aeruginosum*** Sm. Rare. Found on soil in mesic areas. *Uelman 112* (SFV-B)
+***Hennediella stanfordensis*** (Steere) Blockeel. Common. Found on soil. *Wilson 5500* (SFV-B), *Uelman 30* (SFV-B)
†^***Microbryum davallianum*** (Sm.) R.H. Zander. Uncommon. Found in biological soil crust. *Uelman 82* (SFV-B)
†^***Stegonia hyalinotricha*** (Cardot & Ther.) R.H. Zander. Rare. Found in biological soil crust. *Uelman 84* (SFV-B)
†***Syntrichia princeps*** (De Not.) Mitt. Uncommon. Found on rock and the bark of *Sambucus mexicana. Uelman 254* (SFV-B)
†***Syntrichia ruralis*** (Hedw.) F. Weber & D. Mohr. Uncommon. Found on soil and rock. *Uelman 53* (SFV-B)
†***Timmiella crassinervis*** (Hampe) L.F. Koch. Uncommon. Found on soil. *Uelman 39* (SFV-B)
†^***Tortula atrovirens*** (Sm.) Lindb. Rare. Found in biological soil crust. *Uelman 158* (SFV-B)
+^***Tortula brevipes*** (Lesq.) M. Howe. Abundant (most encountered *Tortula*). Found on soil and in biological soil crust. *McFadden 17333* (WIS), *Uelman 59* (SFV-B)
†^***Tortula californica*** E.B. Bartram. Rare. CNPS 1B.2. Found in biological soil crust. *Uelman 57* (SFV-B)
†^***Tortula inermis*** (Brid.) Montagne. Rare. Found in biological soil crust. *Uelman 181* (SFV-B)
†***Tortula muralis*** Hedw. Common. Found on rock and brick. *Uelman 63* (SFV-B)
†***Tortula obtusifolia*** (Schwagr.) Mathieu. Rare. Found on soil. *Uelman 103* (SFV-B) +^
†^***Trichostomopsis australasiae*** (Hook & Grev.) R. Rob. Uncommon. Found in biological soil crust. *Uelman 173* (SFV-B)
+***Vinealobryum brachyphyllum*** (Sull.) R.H. Zander. Uncommon. Found on soil. *McFadden 17936* (COLO):, *Uelman 242* (SFV-B)
†***Vinealobryum eckeliae*** (R.H. Zander) R.H. Zander. Uncommon. Found on bark on the trunks of *Sambucus mexicana* in mesic areas. *Uelman 223* SFV-B)
Vinealobryum vineale (Brid.) R.H. Zander. Abundant (most common *Vinealobryum* encountered). Found on soil, rock, and in biological soil crust. *McFadden 17936* (WIS), *Uelman 203* (SFV-B)

†***Weissia controversa*** Hedw. Common. Found on soil. *Uelman 118* (SFV-B)
†***Weissia ligulifolia*** (E.B. Bartram) Grout. Uncommon. Found on soil. *Uelman 116* (SFV-B)

MARCHANTIOPHYTA

Aytoniaceae

†***Asterella californica*** (Hampe ex Austin) Underw. Uncommon. Found on soil in mesic areas. *Uelman 270* (SFV-B)

Cephaloziellaceae

†***Cephaloziella hampeana*** (Nees) Schiffn. Ex Loeske. Rare. Found on thin soil in rock crevices of Catalina Schist in mesic areas. *Uelman 149* (SFV-B)

Fossombroniaceae

†***Fossombronia longiseta*** Autsin. Occasional. Found on soil in mesic areas. *Uelman 144* (SFV-B)

Lunulariaceae

†***Lunularia cruciata*** (L.) Dumort. ex Lindb. Uncommon. Found on soil along streams. *Uelman 272* (SFV-B)

Porellaceae

†***Porella bolanderi*** (Austin) Pearson. Uncommon. Found on old growth bark of *Sambucus mexicana* and *Rhus integrifolia*. *Uelman 154* (SFV-B)

Ricciaceae

†***Riccia nigrella*** DC. Rare. Found on soil. *Uelman 141* (SFV-B)
†***Riccia sorocarpa*** Bisch. Rare. Found on soil. *Uelman 140* (SFV-B)

Sphaerocarpaceae

†***Sphaerocarpos michelii*** Bellardi. Rare. Found on soil along a mesic slope in the George F Canyon. *Uelman 142* (SFV-B)
†***Sphaerocarpos texanus*** Austin. Common. Found on clay and sandy soil. *Uelman 143* (SFV-B)

Targioniaceae

†***Targionia hypophylla*** L. Occasional. Found on soil in mesic areas. *Uelman 145* (SFV-B)

ANTHOCEROTOPHYTA

Notothyladaceae

†***Paraphymatoceros pearsonii*** (M. Howe) Prosk. Rare. Found on soil in mesic areas. *Uelman 271* (SFV-B)

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CRYPTANTHA PTEROCARYA (TORR.) GREENE VAR. *STENOLOBA* I.M. JOHNST., A NEW ADDITION TO THE FLORA OF CALIFORNIA

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ABSTRACT: *Cryptantha pterocarya* var. *stenoloba* (narrow-lobed cryptantha) is a short-lived winter annual known from just a few occurrences where it grows in stabilized sand dunes in the Mojave and Sonoran Deserts of the southwestern United States, and has only recently been documented, and added, to the flora of California. Taxon history, distribution, and conservation concerns are discussed.

KEYWORDS: *Cryptantha pterocarya*, Boraginaceae, Rice Valley, Riverside County

Cryptantha pterocarya var. *stenoloba* (narrow-lobed cryptantha) is an annual herb in the Boraginaceae that flowers/fruits for a short period after adequate winter rains in March and April, with a single record from May, and has an ecological preference for sandy soils usually associated with stabilized sand dunes. *Cryptantha pterocarya* var. *stenoloba* is one of four varieties of *Cryptantha pterocarya* recognized in California by the Jepson eflora (Simpson et al, 2022) and it has been noted that variety *stenoloba* is distinct enough from other varieties of *C. pterocarya* that it could be recognized at the species level in the future (Mabry et al. 2016). This distinction was also noted by Ivan Johnston on the holotype stating: "It has the one wingless and the three broadly winged nutlets of typical *C. pterocarya* but differs conspicuously in its very elongate narrower calyx-lobes" (*B. Maguire & H.L. Blood 4466* [holotype GH]).

The holotype of *Cryptantha pterocarya* var. *stenoloba* was collected by B. Maguire & H.L. Blood on the 19 May 1933 in Clark County, Nevada with the location stating: "Desert 15 mi E. of Glendale" (*Maguire & Blood 4466* GH) and assigned as a holotype by Ivan Johnston in 1939. On the holotype Ivan Johnston also cites two other specimens being *C. pterocarya* var. *stenoloba*, a second collection of B. Maguire's from April 4th, 1934, from "near Arizona-Nevada line" (*Maguire 4972,* GH), and a collection from Kearney from April 17th, 1937, location stating "between Mesquite and Littlefield, Mohave Co." (*Kearney & Peebles 13184*, GH).

After these collections there appears a significant gap in the collecting record until James André, Andrew Sanders, and Theresa Salvato each made collections of *C. pterocarya* var. *stenoloba* in March of 2008 (*J. André 17490,* GMDRC; *J. André, 17509,* UCR; *A. Sanders 34585,* UCR; *T. Salvato 3208,* UCR; all specimen data accessible from the California Consortium of Herbaria, CCH2 2022). Each specimen was collected relatively close to one another to the southeast of Glendale, Clarke County, Nevada.

In March 2009 while performing field surveys in Rice Valley, Riverside County I made the first collection of *Cryptantha pterocarya* var. *stenoloba* for California (*D. Bell 113*, RSA) where it was found to be occasional/scattered in the stabilized sand dunes of the valley floor. Interestingly André would make the second collection of this taxon in California just a few weeks later in the Whipple Mountains (*J. André 10546*, GMDRC), the specimen label notes it as growing occasionally in sandy soils.

Over the next few years André and I would make additional collections of this taxon in the stabilized sand dunes of Rice Valley both in Riverside and San Bernardino Counties (*D. Bell 752*, RSA; *D. Bell 2177A*, RSA; *J. André 24395*, GMDRC; *J. André 24800*, GMDRC). Sanders collected a specimen approximately 30 miles to the south of Rice Valley in eastern Chuckwalla Valley, where it was also growing in sandy soils of stabilized sand dune (*A. Sanders 37401*, UCR). In March of 2017 André made additional collections in the Cactus Plain Wilderness area of Arizona, 8 miles ENE of Bouse, also in sandy soils (*J. André 38462*, GMDRC; *J. André 38470*, GMDRC).

Altogether *Cryptantha pterocarya* var. *stenoloba* is known from approximately 9 occurrences in three different States: Arizona (2), California (5), and Nevada (2) and appears to be restricted to sandy soils of stabilized sand dunes. In California *Cryptantha pterocarya* var. *stenoloba* is known from approximately five occurrences, the majority of these each other are in relatively close proximity to each other within the greater Rice Valley area between the Arica Mountains and the Whipple Mountains.

This taxon should be considered for inclusion in the California Native Plant Society (CNPS) inventory of rare plants. Based on the available data, I recommend evaluating this taxon to be ranked

as a California Rare Plant Rank (CRPR) 1B.1 or CRPR 1B.2; or plants that are considered rare, threatened, or endangered in California and elsewhere. This taxon fits the 1B category because there are nine known occurrences of it globally and there are only five occurrences in California. Further, approximately 80% of the occurrences appear to be threatened by off highway vehicle activities (OHV), encroachment from invasive species such as *Brassica tournefortii* Gouan, *Erodium cicutarium* (L.) LHer. Ex Aiton, *Schismus barbatus* (L.) Thell. etc., sheep grazing and large-scale development in the form of industrial solar facilities. However, field surveys have not been conducted systematically across the taxon's range, or in potential habitat, so the full extent of its distribution and threats are not known. More field work is needed to evaluate its abundance, distribution, and level of endangerment.

In California, all occurrences of *Cryptantha pterocarya* var. *stenoloba* are entirely on lands managed by the Bureau of Land Management (BLM). By providing a rank for this taxon under the CNPS inventory of rare plants it will provide land managers with additional information on the status of this taxon, it can be included on the BLM list of sensitive species in California, and it will provide an avenue for it to be included in analysis of potential impacts for projects located on public lands.

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NOTEWORTHY COLLECTIONS

LOS ANGELES COUNTY, CALIFORNIA

Recent fieldwork on Santa Catalina Island associated with the Flora of Santa Catalina Island book project (Guilliams et al., *in prep*) resulted in the formal documentation of two new *Medicago* (Fabaceae) species for the island. These new island records are described here.

MEDICAGO MINIMA (L.) Bartal. (FABACEAE) — Santa Catalina Island, along E side of Avalon Canyon Road, in open disturbed field just S of baseball field, 33.331009, -118.336302, WGS84, associated taxa include *Avena barbata*, *Brachypodium*, *Bromus diandrus*, *Bromus rubens*, *Chenopodium murale*, *Cynodon*, *Foeniculum*, *Herniaria*, *Marrubium*, *Medicago polymorpha*, *Melilotus indicus*, *Piptatherum*, *Schismus*, *Sisymbrium irio*, *Sisymbrium orientale*, 61 m, 11 May 2016, *S. A. Junak SCa-2023* (SBBG, SD, UCR).

Previous knowledge: Medicago minima is an annual herb with basally-branched, decumbent to ascending stems to 40 cm long (Small 2011, Wojciechowski and Isley 2012). Stipules are lanceolate to narrowly ovate, entire or minutely dentate proximally; leaflets are usually obovate, rarely oblanceolate, usually 5-8 mm long, 2-7 mm wide, serrated in the distal third, and usually densely hairy. The inflorescence is head-like and usually 2-5-flowered. Flowers are usually 2-4.5 mm long; calyx is appressed-hairy; corolla is yellow and less than twice the length of the calyx. The mature fruit is 3-5-coiled with the overall shape discoid to ovoid, 3-5 mm long, and 2.5-6 mm wide; coil faces are 6-8-veined, veins are unbranched, not reaching the dorsal margin; dorsal spines range from short and tubercle-like to twice as long as coil diameter and hooked distally. Seeds 1-2 per coil, 1.5-2.5 mm long. $2n = 16$.

Medicago minima has a native range spanning Eurasia and northern Africa (Small 2011). It has been introduced in South Africa, India, Japan, Australia, New Zealand, North America (México and the United States of America), and South America (Argentina and Chile). It is one of the most widespread of the introduced *Medicago* taxa in the United States, with one center of distribution spanning from Washington to California, and another in the south-central states; it has been documented occasionally in the eastern USA.

Significance: Medicago minima was collected on Santa Catalina Island by Junak (SCa-2023, SBBG) on May 11, 2016. Plants were observed as a localized population on the east side of Avalon Canyon Road, just south of the baseball field. Plants in this population had fruits bearing long, hooked spines. This collection is significant as the first of this species from Santa Catalina Island, and first from any of the California Channel Islands (Wojciechowski and Isley 2012).

MEDICAGO SPHAEROCARPOS Bertol. (FABACEAE) — Santa Catalina Island, along E side of Avalon Canyon Road, in open disturbed field just S of baseball field, 33.331009, -118.336302, WGS84, associated taxa include *Avena barbata*, *Brachypodium*, *Bromus diandrus*, *Bromus rubens*, *Chenopodium murale*, *Cynodon*, *Foeniculum*, *Herniaria*, *Marrubium*, *Medicago minima, Medicago polymorpha*, *Melilotus indicus*, *Piptatherum*, *Schismus*, *Sisymbrium irio*, *Sisymbrium orientale*, 61 m, 11 May 2016, *S. A. Junak SCa-2024* (SBBG, SD)

Previous knowledge: Medicago sphaerocarpos is an annual herb with basally-branched, procumbent stems, usually to 30 cm long (Small 2011). Stipules are wholly laciniate, or deltate with laciniate margins; leaflets are obovate to cuneate, 7-15 mm long, slightly longer than wide, serrated in the distal third, and usually glabrous or sparsely pubescent. Inflorescences usually 1-3-flowered and axillary. Flowers are usually 3-5 mm long; calyx is pubescent; corolla is yellow and less than twice the length of the calyx. The mature fruit is 5-9-coiled with the overall shape spherical to ovoid, 4-10 mm wide, appearing barrel-like; coils are strongly appressed, coil faces are 4-8-veined, veins unbranched, not reaching the dorsal margin; dorsal spines are usually stout and elongate, rarely tubercle-like or absent. Seeds 1-2 per coil, 3-5 mm long. $2n = 14$.

Medicago sphaerocarpos is native to the Mediterranean, where it has been documented in Africa (Algeria, Morocco, and Tunisia), Asia (Israel and Turkey), and Europe (France, Greece, Italy, Portugal, and Spain) (Small 2011). It is presumed to be present in Germany, but it is unclear if it is naturally occurring there.

Significance: Medicago sphaerocarpos was collected on Santa Catalina Island by Junak (*SCa-2024,*) on May 11, 2016. Plants were observed on the east side of Avalon Canyon Road, just south of the baseball field. This collection is significant as the first expert-determined specimen of this species from Santa Catalina Island and the first from any of the California Channel Islands. It may in fact be the first record for the taxon in the Western Hemisphere, although it appears that at least two records of the closely related and morphologically similar *Medicago murex* Willd. have been collected in North America (cch2.org; gbif.org). These specimens have not been examined to confirm their taxonomic identity, and label data are not readily available to assess provenance and confirm if they were wild-collected. Another member of the genus with barrel-like fruits, *Medicago truncatula* Gaertn., has been documented in southern California. It is possible that at least some of these specimens may be *M. sphaerocarpos*, which we expect occurs elsewhere in California but has been overlooked or misidentified. We examined one specimen of *M. truncatula* deposited in the Clifton Smith Herbarium at SBBG (*A.C. Sanders 34521*, SBBG catalog number 126176) and found it to be correctly identified.

The following couplet can be used with the existing dichotomous key for *Medicago* in the Jepson eFlora treatment of the genus to distinguish between *M. sphaerocarpos* and *M. truncatula*:

Three ridges (separated by grooves) evident on non-spiny parts of coil edges of mature pods; mature pods glabrous; spines mostly bend over no more than 45° to plane of pod surface, so spines scarcely interlace.....***M. sphaerocarpos***

Ridges not present on coil edges of mature pods; mature pods with at least a few simple trichomes; spines mostly bend over 90° to plane of pod surface, so spines very evidently interlace .....***M. truncatula***

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NOTEWORTHY COLLECTIONS

SAN BERNARDINO COUNTY, CALIFORNIA

MENTZELIA ADHAERENS Benth. (LOASACEAE). – Chemehuevi Valley: tributary to Gary Wash at west base of hill with VABM Huevis, 0.2 km E SR95 and 4.5 km NW Pyramid Butte (Svahia Peak SW 7.5' USGS Quad: 34°21'39"N, 114°39'06.5"W, ±100m; T4N R23E S10, NW/4 SE4; UTM 11S 0715952mE, 3804661mN). Alt. 387m. Annual, flowers yellow-orange. Single plant on steep bank of wash. Among braided channels, adjacent sandy flats, and margins of sandy wash in creosote scrub and wash woodland. Associated with *Parkinsonia* sp., *Psorothamnus schottii, Larrea tridentata, Funastrum heterophyllum, Brandegea bigelovii*, and *Hilaria rigida*. *Fred M. Roberts and Carol A. Roberts 7913, 11 Nov 2014*. UCR 267204. Determination by Andrew C. Sanders, UCR Herbarium curator.

Previous Knowledge. Mentzelia adhaerens (common name Baja California stick-leaf), a relatively showy annual or biennial, has been traditionally considered a Mexican endemic found primarily throughout the Desert and Tropical Regions of the Baja California region and in the Lower Colorado and Gulf Coast Desert Regions of Sonora, Mexico. The plant has also been found on Cedros Island, Natividad, Santa Margarita, and Magdalena Islands in the Pacific Island Region and most islands in the Gulf of California (Bajaflora.org 2022; Rebman and Rich 2016). *Mentzelia adhaerens* is scarce outside these regions. A single disjunct locality has been reported from the Sierra de la Catarina (*Fishbein et al. 7403, 7 Aug 2014*, ARIZ) in western Chihuahua about 450 km to the east of the general population (SEINet 2022).

Significance: The Chemehuevi Valley specimen represents the first record of *M. adhaerens* in San Bernardino County, the state of California, and the United States. The Chemehuevi Valley is within the the northern reaches of the Sonoran Desert but is situated about 320 km north of the northernmost confirmed locations for the taxon in Baja California and Sonora. The plant was found following an unusually wet late-summer and fall in eastern San Bernardino County. Lake Havasu City, Arizona, the nearest major weather station to collection site, about 29 km to the east, received 113 mm of precipitation for the months of July through October 2014, nearly four times the average 26 mm for this same period between 1991 and 2020 (WRCC 2023). The period of July through October 2013 was slightly wetter with a total of 114 mm of precipitation.

The single plant encountered suggests the possibility of a waif, but the plant was found in native habitat without any evident human disturbance within 120 meters (the site is about 240 meters east of Highway 95) and there were few non-native taxa in the immediate vicinity. However, this was an incidental detection, and a broader search of the immediate area was not conducted at the time. We were not aware of the significance of the collection until after the conditions that lead to increased moisture at the site had long passed.

Subsequent late summer and falls since 2014 have been significantly drier in the region than the conditions encountered in 2014. The years 2015-2021 averaged only 29 mm of precipitation at Lake Havasu City in the summer and fall. I did return to the site in November 2022 but was unable to relocate *M. adhaerens*. This could be interpreted as further evidence that the plant was a waif. However, desert plants can be notoriously difficult to relocate when in low numbers so a negative result on second site search is not definitive. While conditions were more favorable in 2022 then they had been in years. The summer and early fall precipitation was still well short what was recorded in either 2013 and 2014. About 78 mm or precipitation fell in at Lake Havasu City in 2022 (WRCC 2023) The two-year total summer/fall precipitation in 2021 and 2022 combined was 143 mms as compared to 227 mm combined for 2013 and 2014.

Mentzelia adhearens (Figure 1) can be distinguished from other species within the genus known to occur in the deserts of eastern California by the combination of its annual habit, having pedicellate obconic to turbinate capsule, petals longer then 10 mm long, and by having linear filaments as opposed to dilated outer filaments (Shreve and Wiggins 1964; Prigge 2002; Baldwin et al., eds., 2012; CCH2 2023). The leaves, with an overall broadly triangular outline and 3-7 irregular shallow lobes, also appear to be unique among *Mentzelia* in desert regions of California. *Mentzelia adhearens* also has a unique and distinctive minute hairs with double grappling hook-shaped barbs at the tip and base (Rebman and Roberts 2012). Additional examination of the general region of the Chemehuevi Valley, Turtle, and Whipple Mountains following late-summer and fall rains may yield additional localities. The discovery of this plant in southeastern San Bernardino County also suggests it may occur in eastern Riverside and Imperial counties, and possibly western Arizona. As currently understood *Mentzelia adhaerens* is nowhere common in California and may qualify as a candidate for the California Rare Plant Rank (CRPR) of 2B. CRPR 2B plants are rare in California but more common elsewhere.

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Figure 1: *Mentzelia adhaerens*, **left:** capsule, **right:** flower and leaves.

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NOTEWORTHY COLLECTIONS

SAN BERNARDINO COUNTY, CALIFORNIA

SIDALCEA HICKMANII Greene subsp. *PARISHII* (B.L. Rob.) C.L. Hitchc. (MALVACEAE) **San Bernardino Mountains:** Yucaipa Ridge, along Aqueduct Trail NE of Yucaipa Ridge Truck Trail, 1.2 km (0.75 mi) SSW (197°) of Mountain Home Village, 1.8 km SE of Thurman Flats, near junction with aqueduct trail (Yucaipa 7.5' Q.: 34°05'22"N, 117°00'11" ±1000m); T1S R1W, S17, NE/4). Alt.: 1477m/4845ft. Burned chaparral and oak woodland along ridge top; with *Quercus wislizenii* A. DC., *Q. chrysolepis* Liebm., *Pinus coulteri* D. Don, *Cercocarpus betuloides* Nutt., *Ceanothus leucodermis* Greene. Loose soil over sandstone bedrock (displaying fossil ripples in places). Scarce to locally common perennial on slopes, often partially shaded. About 500 plants seen along aqueduct trail, and population extended NW down slope onto a bench where thousands of plants seen. Fls. lavender-pink. *A.C. Sanders, T.B. Salvato, Fred M. Roberts 44205, 7 Aug 2021* (UCR). **San Bernardino Mountains:** Yucaipa Ridge, along Aqueduct Trail NE of Yucaipa Ridge Truck Trail, 1.25 km SSE (176°) of Mountain Home Village (Forest Falls 7.5' Q.: 34°05'22"N, 116°59'53" ±100m). Alt.: 1509m/4950ft. North to northwest-facing slopes and flat area in burned (Oct. 2020) woodland canyon with resprouting *Quercus chrysolepis* Liebm., *Garrya* sp., *Phacelia ramosissima* Douglas ex Lehm., *Malocothamnus fasciculatus* (Nutt. ex Torr. & A. Gray) Greene, *Ehrendorferia chrysantha* (Hook. & Arn.) Rylander, *Hosackia crassifolia* Benth. Fairly common perennial to 35 cm tall; fls. pale pink. All plants young, post fire, but developing thick stems and large roots and not annual. Some plants browsed, presumably by deer. *A.C. Sanders, T.B. Salvato, Arlee Montalvo 44240, 11 Aug 2021* (UCR). **San Bernardino Mountains:** Yucaipa Ridge, along aqueduct trail, 34.08937, -116.99153 ±10 meters. WGS84. Elev. 1,518 meters/4980 feet. Moderately steep, dry rocky N-facing slope in drainage. Burnt woodland w/filtered sunlight. Silty, sandy-gravelly soils. Area burned in 2020 El Dorado Fire. *Quercus chrysolepis* Liebm., *Pseudotsuga macrocarpa* (Vasey) Mayr, *Toxicodendron diversilobum* (Torr. & A. Gray) Greene, *Hosackia crassifolia* Benth., *Garrya flavescens* S. Watson, *Argemone munita* Durand & Hilg., *Erigeron foliosus* Nutt., *Sambucus Mexicana* C. Presl ex DC., *Bromus tectorum* L. Localized population, 1000+ individuals. Majority of inflorescences were removed by animal browsing, presumably by deer. Many plants with arrested development at seedling stage, appearing drought-stressed. *Joy D. England & Sharon Estrada 2840, 7 Sep 2021* (RSA *in process*).

Previous Knowledge: Sidalcea hickmanii subsp. *parishii* is found in chaparral, woodland, and open conifer forest in San Luis Obispo and Santa Barbara Counties, California, and disjunct south to the San Bernardino Mountains of southwest San Bernardino County at elevations between 800 and 2000 meters (Hill 2012; California Consortium of Herbaria 2 (CCH2 2023)). It is a perennial herb with pinkish flowers that typically blooms from June through August (Slotta ibid.) The taxon was first collected in the San Bernardino Mountains by Samuel B. Parish near Seven Oaks in June 1895 (CCH2 2023) and subsequently has been found at about 10 locations in San Bernardino County, mostly in the upper Santa Ana River watershed, where it occurs primarily in the pine-oak transitional habitat between 1,500 and 1,800 meters (California Natural Diversity Data Base 2022; CCH2 2023; Fraga et al. 2011). *Sidalcea h.* subsp. *parishii* was first documented on Yucaipa Ridge by F.M. Reed along the "pipeline trail of San Antonio Power Company" at 1,400 meters (4600 feet) on June 2, 1930 [*Reed 2755* (UC)]. It has typically been observed in the years following a fire, which has complicated relocating and monitoring populations (71 Federal Register 53768). Overall, the plant is considered rare. The California Native Plant Society (CNPS), in its Inventory of Rare and Endangered Plants, assigns it a California Rare Plant Rank of 1B.1 (CNPS 2023). Plants assigned this rank are considered rare and endangered in California, and seriously threatened. While the plant is presumed extant over all or most of its historical range in the San Bernardino Mountains, plants have only been reported at six sites since 2005. Estimates for individuals have varied from a single plant to 1,000, the largest reported at Hawes Ranch Meadow along Cox Creek in 2005 (California Natural Diversity Data Base (CDFW) 2022; *V.L. Soza et al. 1549* (RSA)). Fewer than a third of the known populations in the San Bernardino Mountains have estimated numbers of individuals.

Significance: These are the first documented records of *Sidalcea hickmanii* subsp. *parishii* (Figure 1) on Yucaipa Ridge in over 90 years and in the San Bernardino Mountains in over 12 years. The initial detection was for a single plant (*Sanders et al. 44205*) growing on a north-facing road bank on loamy soils in mixed chaparral and oak woodland burned by the El Dorado Fire in September 2020. It was growing in association with resprouting *Quercus wislizenii* and *Q. chrysolepis, and Achillea millefolium* L., *Monardella micrantha* A. Gray, *Silene laciniata* Cav., and *Erigeron foliosus*. About 250 additional plants were seen along the aqueduct trail near the collection site on 7 August 2021. The majority of plants seen in early August 2021 appear to have been seedlings or immature plants, likely having germinated four to six months earlier. Author Fred Roberts estimated at least 2,000 plants were likely present on the adjacent bench just north of the collection site during the initial inspection. This site and a second found about 400 meters to the east (by air) along the aqueduct trail on 11 August 2021 (*Sanders et. al., 44240*), were further documented and mapped by Arlee Montalvo and Colin Barrows on 15 August 2021 (A. Montalvo, California Native Plant Society, *pers. comm.* 19 Aug 2021). About 15,000 plants were estimated to be present between the two sites with the majority, over 10,000, at the westernmost site. A third location, with about 1,000 individuals, was documented on 7 September 2021 by Joy England and Sharon Estrada (*England & Estrada 2840*) about 1.0 km (by air) to the east along the aqueduct trail. The three sites combined were estimated to host at least 16,000 plants over about 9 hectares (23 acres).

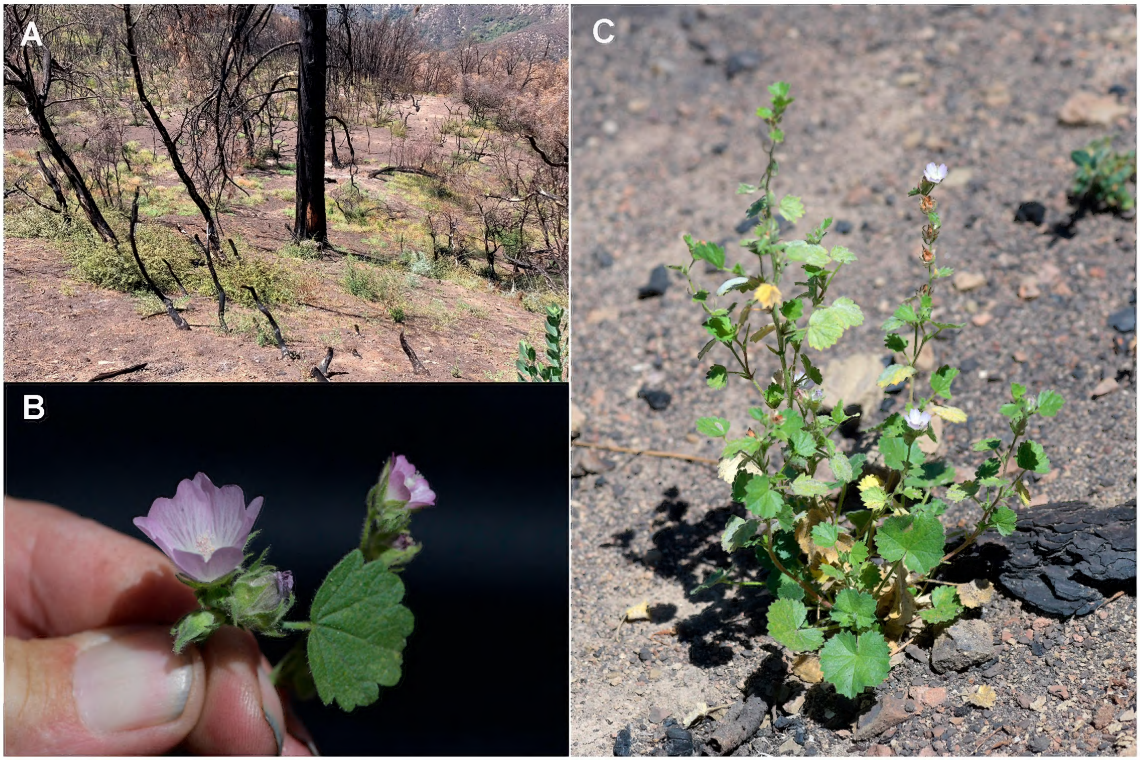

Figure 1: *Sidalcea hickmanii subsp. parishii* at Yuciapa Ridge, San Bernardino Mountains: **A:** plant in habitat following fire, **B:** flower and leaf; and **C:** habit..

The large numbers of individual *Sidalcea h.* subsp. *parishii* observed at Yucaipa Ridge in the year following the El Dorado Fire strongly suggests that the taxon is adapted to a fire-follower ecology. Previously reported populations with much smaller numbers (CNDDB 2022) were likely found later in the fire recovery process. We also anticipate that the number of plants will decline at this location as the habitat recovers from the fire.

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